Contents

<table>
<thead>
<tr>
<th>Foreword</th>
<th>vii</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgements</td>
<td>ix</td>
</tr>
</tbody>
</table>

1 Introduction: investigating the archaeology of the southern Curtis Coast  

<table>
<thead>
<tr>
<th>Introduction</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>The continental narrative</td>
<td>1</td>
</tr>
<tr>
<td>Refining mid-to-late Holocene chronologies</td>
<td>5</td>
</tr>
<tr>
<td>Rockshelters versus open sites: some sampling issues</td>
<td>7</td>
</tr>
<tr>
<td>Rockshelters versus open sites: some taphonomic issues</td>
<td>8</td>
</tr>
<tr>
<td>Background to the study</td>
<td>10</td>
</tr>
<tr>
<td>The study region</td>
<td>10</td>
</tr>
<tr>
<td>Aims of the study</td>
<td>11</td>
</tr>
</tbody>
</table>

2 The study region: the southern Curtis Coast  

<table>
<thead>
<tr>
<th>Introduction</th>
<th>13</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical setting</td>
<td>13</td>
</tr>
<tr>
<td>Geology and geomorphology</td>
<td>14</td>
</tr>
<tr>
<td>Climate</td>
<td>17</td>
</tr>
<tr>
<td>Hydrology</td>
<td>17</td>
</tr>
<tr>
<td>Flora</td>
<td>18</td>
</tr>
<tr>
<td>Fauna</td>
<td>18</td>
</tr>
<tr>
<td>Palaeoenvironment and environmental change</td>
<td>20</td>
</tr>
<tr>
<td>Cultural setting</td>
<td>22</td>
</tr>
<tr>
<td>Previous archaeological research</td>
<td>25</td>
</tr>
<tr>
<td>Gooreng Gooreng Cultural Heritage Project</td>
<td>27</td>
</tr>
<tr>
<td>Other dated archaeological sites in the region</td>
<td>30</td>
</tr>
<tr>
<td>Agnes Beach Midden (ABM)</td>
<td>30</td>
</tr>
<tr>
<td>Middle Island Sandblow Site (MISS)</td>
<td>31</td>
</tr>
<tr>
<td>Round Hill Creek Mound (RHCM)</td>
<td>33</td>
</tr>
<tr>
<td>Worthington Creek Midden (WCM)</td>
<td>33</td>
</tr>
<tr>
<td>Discussion</td>
<td>34</td>
</tr>
<tr>
<td>Summary</td>
<td>35</td>
</tr>
</tbody>
</table>

3 Methods of investigation  

<table>
<thead>
<tr>
<th>Introduction</th>
<th>37</th>
</tr>
</thead>
</table>
Excavation strategy 37
Excavation methods 38
Radiocarbon dating and calibration 39
  Marine and estuarine reservoir effects 39
  Radiocarbon age calibration 40
  Dating terminology 40
Laboratory analyses 41
  Invertebrate remains 41
  Vertebrate remains 44
  Stone artefacts 45
  Non-artefactual stone 45
  Charcoal 45
  Organic material 45
Age-depth curves and analytical units 45
Summary 45

4 Marine and estuarine reservoir effects in central Queensland: determination of \( \Delta R \) values 47
Introduction 47
Background 49
Australian marine reservoir studies: a review 51
  The original study 51
  Further studies 53
The present study: methods 55
Results 56
  Live-collected known-age samples 56
  Archaeological shell/charcoal paired samples 57
  Temporal variability or \( \Delta R(t) \) 61
Discussion 61
Summary 64

5 Bivalve conjoin analyses: assessing site integrity 65
Introduction 65
Background 65
General methods and approach 68
Seven Mile Creek Mound bivalve conjoin analysis 69
  Introduction 69
  Aims 69
  Methods 70
  Results 70
Bivalve conjoin analysis blind test 71
  Introduction 71
  Aims 71
  Methods 71
  Results 72
Discussion 72
Summary 77

6 Seven Mile Creek Mound 79
Introduction 79
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site description and setting</td>
<td>79</td>
</tr>
<tr>
<td>Excavation methods</td>
<td>81</td>
</tr>
<tr>
<td>Cultural deposit and stratigraphy</td>
<td>82</td>
</tr>
<tr>
<td>Radiocarbon dating and chronology</td>
<td>83</td>
</tr>
<tr>
<td>Stratigraphic integrity and disturbance</td>
<td>84</td>
</tr>
<tr>
<td>Laboratory methods</td>
<td>85</td>
</tr>
<tr>
<td>Cultural materials</td>
<td>85</td>
</tr>
<tr>
<td>Invertebrate remains</td>
<td>85</td>
</tr>
<tr>
<td>Vertebrate remains</td>
<td>92</td>
</tr>
<tr>
<td>Stone artefacts</td>
<td>92</td>
</tr>
<tr>
<td>Other remains</td>
<td>93</td>
</tr>
<tr>
<td>Discussion</td>
<td>94</td>
</tr>
<tr>
<td>Summary</td>
<td>96</td>
</tr>
</tbody>
</table>

7 **Mort Creek Site Complex**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>97</td>
</tr>
<tr>
<td>Site description and setting</td>
<td>97</td>
</tr>
<tr>
<td>Previous investigations</td>
<td>99</td>
</tr>
<tr>
<td>Excavation methods</td>
<td>101</td>
</tr>
<tr>
<td>Cultural deposit and stratigraphy</td>
<td>102</td>
</tr>
<tr>
<td>Radiocarbon dating and chronology</td>
<td>102</td>
</tr>
<tr>
<td>Stratigraphic integrity and disturbance</td>
<td>104</td>
</tr>
<tr>
<td>Laboratory methods</td>
<td>106</td>
</tr>
<tr>
<td>Cultural materials</td>
<td>106</td>
</tr>
<tr>
<td>Invertebrate remains</td>
<td>106</td>
</tr>
<tr>
<td>Vertebrate remains</td>
<td>110</td>
</tr>
<tr>
<td>Stone artefacts</td>
<td>111</td>
</tr>
<tr>
<td>Other remains</td>
<td>112</td>
</tr>
<tr>
<td>Discussion</td>
<td>112</td>
</tr>
<tr>
<td>Summary</td>
<td>113</td>
</tr>
</tbody>
</table>

8 **Pancake Creek Site Complex**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>115</td>
</tr>
<tr>
<td>Site description and setting</td>
<td>115</td>
</tr>
<tr>
<td>Excavation methods</td>
<td>117</td>
</tr>
<tr>
<td>Cultural deposit and stratigraphy</td>
<td>119</td>
</tr>
<tr>
<td>Radiocarbon dating and chronology</td>
<td>122</td>
</tr>
<tr>
<td>Stratigraphic integrity and disturbance</td>
<td>123</td>
</tr>
<tr>
<td>Laboratory methods</td>
<td>123</td>
</tr>
<tr>
<td>Cultural materials</td>
<td>124</td>
</tr>
<tr>
<td>Invertebrate remains</td>
<td>124</td>
</tr>
<tr>
<td>Vertebrate remains</td>
<td>124</td>
</tr>
<tr>
<td>Stone artefacts</td>
<td>124</td>
</tr>
<tr>
<td>Other remains</td>
<td>128</td>
</tr>
<tr>
<td>Discussion</td>
<td>129</td>
</tr>
<tr>
<td>Summary</td>
<td>129</td>
</tr>
</tbody>
</table>

9 **Ironbark Site Complex**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>131</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>Site description and setting</td>
<td>131</td>
</tr>
<tr>
<td>Excavation methods</td>
<td>135</td>
</tr>
<tr>
<td>Cultural deposit and stratigraphy</td>
<td>139</td>
</tr>
<tr>
<td>Radiocarbon dating and chronology</td>
<td>144</td>
</tr>
<tr>
<td>Stratigraphic integrity and disturbance</td>
<td>146</td>
</tr>
<tr>
<td>Laboratory methods</td>
<td>147</td>
</tr>
<tr>
<td>Cultural materials</td>
<td>147</td>
</tr>
<tr>
<td>Invertebrate remains</td>
<td>147</td>
</tr>
<tr>
<td>Vertebrate remains</td>
<td>151</td>
</tr>
<tr>
<td>Stone artefacts</td>
<td>152</td>
</tr>
<tr>
<td>Glass artefacts</td>
<td>152</td>
</tr>
<tr>
<td>Other remains</td>
<td>154</td>
</tr>
<tr>
<td>Discussion</td>
<td>154</td>
</tr>
<tr>
<td>Summary</td>
<td>156</td>
</tr>
<tr>
<td>10 Eurimbul Creek 1</td>
<td>157</td>
</tr>
<tr>
<td>Introduction</td>
<td>157</td>
</tr>
<tr>
<td>Site description and setting</td>
<td>157</td>
</tr>
<tr>
<td>Excavation methods</td>
<td>160</td>
</tr>
<tr>
<td>Cultural deposit and stratigraphy</td>
<td>160</td>
</tr>
<tr>
<td>Radiocarbon dating and chronology</td>
<td>161</td>
</tr>
<tr>
<td>Stratigraphic integrity and disturbance</td>
<td>162</td>
</tr>
<tr>
<td>Laboratory methods</td>
<td>162</td>
</tr>
<tr>
<td>Cultural materials</td>
<td>162</td>
</tr>
<tr>
<td>Invertebrate remains</td>
<td>162</td>
</tr>
<tr>
<td>Vertebrate remains</td>
<td>163</td>
</tr>
<tr>
<td>Other remains</td>
<td>166</td>
</tr>
<tr>
<td>Discussion</td>
<td>166</td>
</tr>
<tr>
<td>Summary</td>
<td>167</td>
</tr>
<tr>
<td>11 Eurimbul Creek 2</td>
<td>169</td>
</tr>
<tr>
<td>Introduction</td>
<td>169</td>
</tr>
<tr>
<td>Site description and setting</td>
<td>169</td>
</tr>
<tr>
<td>Excavation methods</td>
<td>171</td>
</tr>
<tr>
<td>Cultural deposit and stratigraphy</td>
<td>171</td>
</tr>
<tr>
<td>Radiocarbon dating and chronology</td>
<td>172</td>
</tr>
<tr>
<td>Stratigraphic integrity and disturbance</td>
<td>173</td>
</tr>
<tr>
<td>Laboratory methods</td>
<td>173</td>
</tr>
<tr>
<td>Cultural materials</td>
<td>173</td>
</tr>
<tr>
<td>Invertebrate remains</td>
<td>173</td>
</tr>
<tr>
<td>Other remains</td>
<td>174</td>
</tr>
<tr>
<td>Discussion</td>
<td>176</td>
</tr>
<tr>
<td>Summary</td>
<td>176</td>
</tr>
<tr>
<td>12 Eurimbul Site 1</td>
<td>177</td>
</tr>
<tr>
<td>Introduction</td>
<td>177</td>
</tr>
<tr>
<td>Site description and setting</td>
<td>177</td>
</tr>
<tr>
<td>Previous investigations</td>
<td>180</td>
</tr>
<tr>
<td>Excavation methods</td>
<td>184</td>
</tr>
</tbody>
</table>
### 13 Tom’s Creek Site Complex

- **Introduction**
- **Site description and setting**
- **Excavation methods**
- **Cultural deposit and stratigraphy**
- **Radiocarbon dating and chronology**
- **Stratigraphic integrity and disturbance**
- **Laboratory methods**
- **Cultural materials**
  - Invertebrate remains
  - Vertebrate remains
  - Stone artefacts
  - Other remains
- **Discussion**
- **Summary**

### 14 Synthesis of results: towards an archaeology of the southern Curtis Coast

- **Introduction**
- **Regional site chronology**
- **Regional site contents**
  - Shellfish remains
  - Fish remains
  - Charcoal
  - Stone artefacts
- **Regional patterns in site structure**
- **Discussion**
- **Modelling regional settlement histories**
  - Phase I (pre-4,000 BP–1,500 BP)
  - Phase II (c.1,500 BP–c.AD 1850s)
  - Phase III (c.AD 1850s–c.AD 1920s)
- **Summary**

### 15 Wider implications and conclusions

- **Introduction**
- **Key findings**
- **Regional context and implications**
List of Figures

1.1 The Australian region, showing places mentioned in the text (after Allen and O’Connell 1995:vi).

1.2 Distribution of dated archaeological sites in Queensland with a Holocene component (Ulm and Reid 2000:3).

2.1 The Gooreng Gooreng Cultural Heritage Project study area, showing major towns and the general distribution of Gooreng Gooreng speakers (heavy line) (after Horton 1994; Williams 1981). The southern Curtis Coast study area is shown by the box.

2.2 The southern Curtis Coast study area, showing all recorded archaeological sites as triangles (after Ulm and Lilley 1999). Site designations are shown for sites which are not illustrated in Figs 2.9–2.11. Heavy black lines on Middle Island indicate the general location of extensive low density shell deposits.

2.3 General view of estuary and near-coastal ranges across Jenny Lind Creek. Such estuaries are common in the region and support diverse populations of marine life. Facing southwest.

2.4 Freshwater wetlands adjoining the upper reaches of Round Hill Creek. This swamp is part of a vast network of interconnected wetland areas located in the swales between ridge systems. Facing north.

2.5 Example of recent bank recession of the north bank of Middle Creek, showing concrete stairs once used to access the beach from the top of the erosion bank some 15m away from the contemporary section. Facing northwest.

2.6 Beach ridge vegetation in Eurimbula National Park, including weeping cabbage palm communities (*L. australis*) and bracken (*P. esculentum*).

2.7 Mud ark (*A. trapezia*) in a dense paddock of seagrass (*Z. capricornia*) in the middle of Round Hill Creek. The presence of mud ark valves in sites dated to 4,000 BP indicate that seagrass beds are a long-term feature of the local environment. Facing west.

2.8 Cluster of telescope mud whelk (*T. telescopium*) on the mangrove fringe of Eurimbula Creek. These whelks are abundant throughout the region, although virtually absent from archaeological deposits. Facing west.

2.9 Northern segment of the southern Curtis Coast study area showing recorded archaeological sites as triangles in the Hummock Hill Island and Seven Mile Creek areas. EPA site numbers are shown. Sites without a ‘JE:’ prefix have a ‘KE:’ prefix which has been omitted owing to space limitations.

2.10 Central segment of the southern Curtis Coast study area showing recorded archaeological sites as triangles in the Turkey Beach, Rodds Peninsula and Middle Island areas. EPA site numbers are shown where available. Sites without a ‘JF:’ prefix have a ‘KE:’ prefix which has been omitted owing to space limitations. Sites with a ‘SCC’ prefix are currently unregistered sites.

2.11 Southern segment of the southern Curtis Coast study area showing recorded archaeological sites as triangles in the Agnes Water, Round Hill Creek, Eurimbula Creek and Middle Creek areas. EPA site numbers are shown. All sites have a ‘KE:’ prefix which has been omitted owing to space limitations.

2.12 Stone-walled tidal fishtrap at Richards Point on Rodds Peninsula. This is one of two such features recorded in the study region. The second fishtrap is located in Mort Creek 4km to the south (see Chapter 8). Facing north (Photograph: Ian Lilley).
2.13 Scarred tree on eucalypt at Agnes Water (KE:A60) (Photograph: Environmental Protection Agency).

2.14 Agnes Beach Midden. Facing southwest.

2.15 Worthington Creek Midden. Facing northwest.

2.16 Middle Island Sandblow Site, showing pipi (*D. deltoides*) scatter on the surface of the sandblow. A range of cultural and non-cultural material is exposed on the eastern margin of the sandblow. Facing north.

2.17 Middle Island Sandblow Site, showing microgranite grinding implement located on the surface of the sandblow. Obviously modified and apparently unmodified pieces of stone are common along the eastern margin of the sandblow. Facing south.


3.2 Bivalve terminology and measured attributes (after Claassen 1998:21; Hedley 1904).


3.4 Map of Australia, showing places mentioned in the text. The boxed area indicates the southern Curtis Coast study area.

4.1 Map of the southern Curtis Coast, showing places mentioned in the text. The boxed area indicates the southern Curtis Coast study area.

4.2 (a) Part of the central Queensland coast showing the location of ‘pre-bomb’ live-collected shell specimens (□) and (b) estuaries and archaeological sites (▲) discussed in the text. SMCM=Seven Mile Creek Mound; MCSC=Mort Creek Site Complex; PCSC=Pancake Creek Site Complex; ISC=Ironbark Site Complex; ES1=Eurimbula Site 1; TCSC=Tom’s Creek Site Complex; ABM=Agnes Beach Midden.

4.3 Example of ΔR calculation method for pair NZA-12117/Wk-8326 (see caption 60 for Table 4.6).

4.4 ΔR values calculated for the southern Curtis Coast.

4.5 Calibrated radiocarbon age-ranges from the Seven Mile Creek Mound, using various ΔR values (see Table 4.7).

5.1 Schematic representation of conjoin identification procedure. O=individual *A. trapezia* valve. In this matrix, left and right valves are arranged in descending size order. See text for details.

5.2 Maximum vertical distance separating all conjoined valve-pairs, Seven Mile Creek Mound, Square A.

5.3 Distribution of identified *A. trapezia* valve-pairs (n=61), Seven Mile Creek Mound, Square A. An additional 22 valve-pairs encountered as articulated specimens during excavation are shown as short horizontal lines down the right hand side of the figure (see Chapter 6). Line termination points indicate the vertical mid-points of the excavation units from which conjoining valves were recovered. Short horizontal lines indicate valve-pairs identified within excavation units. Not to scale on the horizontal axis.

5.4 Particle size distribution of *A. trapezia* after heating at various temperatures and then mechanical destruction for 30 seconds (after Robins and Stock 1990:98).

5.5 Fragmentation of *A. trapezia*, Seven Mile Creek Mound, Square A, expressed as the number of fragments per 100g of shell.

6.1 The Seven Mile Creek catchment area showing the location of the Seven Mile Creek Mound as a triangle. Dark grey shading indicates the general extent of mangrove, saltflats and claypans.

6.2 Topographic map of the site area, showing the position of the excavation. The site datum is shown as a triangle. Dashed lines indicate the location of the tide strand line during the period of excavation. The wide shaded line denotes a 4WD track on the edge of the saltflats. Contours in 10cm intervals.

6.3 General view of the Seven Mile Creek Mound. Note the low fringing mangroves on the intertidal flats through the gap in trees at rear left of frame. Facing south.
6.4 General view of the completed excavation. Note the dark zone of grass root penetration at the top of the deposit. Facing north.

6.5 General view of completed excavation (Squares D–A). Note the stratigraphic break at the base of the shell deposit. Facing north.

6.6 Stratigraphic section, Seven Mile Creek Mound, Squares A–D.

6.7 Distribution of identified *A. trapezia* valve-pairs (n=61), Seven Mile Creek Mound, Square A. An additional 22 valve-pairs encountered as articulated specimens during excavation are shown as short horizontal lines down the right hand side of the figure. Line termination points indicate the vertical mid-points of the excavation units from which conjoining valves were recovered. Short horizontal lines indicate valve-pairs identified within excavation units. Not to scale on the horizontal axis. See Chapter 5 for details of methods.

6.8 Abundance of oyster (*S. glomerata*).

6.9 Abundance of hairy mussel (*T. hirsutus*).

6.10 Abundance of mud ark (*A. trapezia*).

6.11 Abundance of scallop (*P. sugillata*).

6.12 Abundance of fish bone.

6.13 Abundance of charcoal.

6.14 Abundance of artefactual stone.

6.15 Abundance of non-artefactual stone.

6.16 Relative contribution of dominant shellfish taxa. Note that XU1 is excluded as it contained negligible quantities of shell (see Appendix 4).

7.1 The Mort Creek catchment area. Dark grey shading indicates the general extent of mangrove, saltflats and claypans. Dashed lines denote 4WD tracks.

7.2 Topographic map of the Mort Creek Site Complex. Contours are in 0.5m intervals. Dark grey shading indicates the general extent of mangroves. Dots indicate auger test holes (not all shown).

7.3 Chenier ridge at the Mort Creek Site Complex extending into Rodds Harbour. Facing southwest (Photograph: Ian Lilley).

7.4 General view of completed excavation, Squares A–D. Note continuous microgranite bedrock across the base of the excavation. Facing north.

7.5 General view of completed excavation, showing the section of Squares C–D. Note shell layer across the upper 20cm of the deposit. Facing east.

7.6 Stratigraphic section, Mort Creek Site Complex, Squares A–D.

7.7 Distribution of identified *A. trapezia* valve-pairs (n=10), Mort Creek Site Complex, Square C. Line termination points indicate the vertical mid-points of the excavation units from which conjoining valves were located. Short horizontal lines indicate valve-pairs identified within excavation units. Not to scale on the horizontal axis. See Chapter 5 for details of methods.

7.8 Abundance of mud ark (*A. trapezia*).

7.9 Abundance of oyster (*S. glomerata*).

7.10 Abundance of whelk (*P. ebininus*).

7.11 Abundance of fish bone.

7.12 Abundance of organic material.

7.13 Abundance of charcoal.

7.14 Abundance of artefactual stone.

7.15 Abundance of non-artefactual stone.

7.16 Relative contribution of dominant shellfish taxa. Note that XU1 is excluded as it contained negligible quantities of shell (see Appendix 4).

8.1 The Pancake Creek catchment area showing the location of the Pancake Creek Site Complex. Dark grey shading indicates the general extent of mangrove, saltflats and claypans.
8.2 Detail of the site area showing the location of excavated squares and beach ridge vegetation units. 3a= *Corymbia intermedia* tall woodland with shrub/heath midstratum; 3b= *C. tessellaris, C. intermedia* tall to very tall woodland with *Livistona decipiens/Melaleuca dealbata* and shrub understorey; 3c= *L. decipiens/M. decipiens* tall forest/tall open forest with emergent *Eucalyptus tereticornis/C. intermedia*; 3d= *L. decipiens open forest*; 3e= *Acacia juliflora/A. flavescens* tall shrubland; 3f= *M. dealbata* open forest; 5a= *C. tessellaris* woodland with understorey of low microphyll vine thicket; 5c= *Casuarina equisetifolia* low open woodland; 5d= *Tall open shrubland* (windsheared vegetation) (after QDEH 1997).

8.3 Eroding bank in the vicinity of Squares G–H showing displaced trees and shell. Facing southwest.

8.4 General view of completed excavation at Squares C–F. Facing south.

8.5 Close-up view of concentration of *A. trapezia* valves encountered in Square H, XU9, at a depth of 26–30cm. These shells date to around 600 years ago and include a single valve conjoin. Facing southeast.

8.6 Stratigraphic section, Pancake Creek Site Complex, Squares A–B.

8.7 Stratigraphic section, Pancake Creek Site Complex, Squares C–F.

8.8 Stratigraphic section, Pancake Creek Site Complex, Squares G–H.

8.9 Abundance of oyster (*S. glomerata*).

8.10 Abundance of mud ark (*A. trapezia*).

8.11 Abundance of whelk (*P. ebininus*).

8.12 Abundance of scallop (*P. sugillata*).

8.13 Abundance of hairy mussel (*T. hirsutus*).

8.14 Abundance of organic material.

8.15 Abundance of charcoal.

8.16 Abundance of non-artefactual stone.

9.1 The Middle Creek catchment area showing the location of the Ironbark Site Complex (ISC) and nearby excavated sites (EC1=Eurimbula Creek 1; EC2=Eurimbula Creek 2; ES1=Eurimbula Site 1; TCSC=Tom’s Creek Site Complex). Dark grey shading indicates the general extent of mangrove, saltflats and claypans. Dotted shading indicates land above 200m. Solid dots indicate local population centres.

9.2 Aerial view of the Ironbark Site Complex, showing the maximum extent from the creek of shell and stone exposed at the surface (heavy line) and the general location of excavation squares (after BPA Run 15D/79, 30 July 1996). Based on data provided by the Department of Natural Resources and Mines, Queensland 2006, which gives no warranty in relation to the data (including accuracy, reliability, completeness or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data.

9.3 Site plan of Ironbark Site Complex, showing area of Squares A–M. Contours are in 0.5m intervals. Rock outcrops and low density artefactual material continue for a further c.50m southwest of the limits of this plan.

9.4 Site plan of Ironbark Site Complex, showing area of Square N. Contours are in 0.5m intervals. Only cycads over 50cm in trunk height are shown.

9.5 Site plan of Ironbark Site Complex, showing area of Squares O–P. Contours are in 0.5m intervals. Tree stumps are shown on the fringing beach.

9.6 Site plan of Ironbark Site Complex, showing area of Squares Q–R. Contours are in 0.5m intervals.

9.7 General view of the western side of the quarry sloping into Middle Creek, showing a massive core in centre foreground. Middle Island in background. Facing north.

9.8 Surface of Square E, XU1, showing photographic recording method. Facing north.
9.9 Large flake (FS54) manufactured on non-local banded rhyolite recovered from the surface of Square G on the quarry. Note the heavy edge-damage along the distal margin. Scale=1cm (Photograph: Paul Aurisch).

9.10 Water-rounded microgranite hammerstone (FS88) exhibiting impact-pitting recovered from the surface of Square J on the quarry. Several similar artefacts were noted eroding from adjacent middens. Bustard Head, some 11km to the north is the nearest source of this raw material. Scale=1cm (Photograph: Paul Aurisch).


9.12 Close-up view of edge-ground hatchet (FS2747) (Photograph: Paul Aurisch).

9.13 Stratigraphic section, Ironbark Site Complex, Squares L–M.

9.14 Stratigraphic section, Ironbark Site Complex, Square N.

9.15 Stratigraphic section, Ironbark Site Complex, Squares O–P.

9.16 Stratigraphic section, Ironbark Site Complex, Squares Q–R.

9.17 Abundance of artefactual stone.

9.18 Abundance of artefactual stone.

9.19 Abundance of oyster (*S. glomerata*).

9.20 Abundance of oyster (*S. glomerata*).

9.21 Abundance of charcoal.

9.22 Abundance of charcoal.

9.23 Abundance of pumice.

9.24 Abundance of pumice.

9.25 Weight-depth distribution of individually provenanced artefacts greater than 30mm in maximum dimension, Square E (n=784).

10.1 The Eurimbula Creek catchment area showing the location of Eurimbula Creek 1 (EC1) and nearby excavated sites (ISC=Ironbark Site Complex; EC2=Eurimbula Creek 2; ES1=Eurimbula Site 1; TCSC=Tom’s Creek Site Complex). Dark grey shading indicates the general extent of mangrove, saltflats and claypans. Dotted shading indicates land above 200m. Solid dots indicate local population centres.

10.2 Site plan of Eurimbula Creek 1 area. Contours are in 0.5m intervals.

10.3 Excavations in progress at Squares A–D, showing cattle track on western (left) margin of the excavation. Facing north.

10.4 General view of completed excavation, Squares A–D, showing transect through erosion bank. Facing north.

10.5 General view of completed excavation, Squares A–D, showing transect through erosion bank. Facing east.

10.6 Stratigraphic section, Eurimbula Creek 1, Squares A–D.

10.7 Abundance of oyster (*S. glomerata*).

10.8 Abundance of oyster (*S. glomerata*).

10.9 Abundance of charcoal.

10.10 Abundance of charcoal.

10.11 Abundance of pumice.

10.12 Abundance of pumice.

11.1 Site plan of Eurimbula Creek 2 area. Contours are in 0.5m intervals. Only major trees in the immediate area of the excavation are shown.

11.2 General view of location of Square A, showing disturbance zone to the northeast (rear left) of the excavation. Facing east.

11.3 General view of completed excavation, Square A, showing a large root protruding from the east section. Facing north.

11.4 General view of completed excavation, showing disturbance zone to the east (right) of the excavation. Facing north.
11.5 Stratigraphic section, Eurimbula Creek 2, Square A. 172
11.6 Abundance of oyster (S. glomerata). 174
11.7 Abundance of charcoal. 175
11.8 Abundance of pumice. 175
11.9 Abundance of organic material. 175
12.1 Lower reaches of Round Hill Creek, showing the location of Transects A, B and C at Eurimbula Site 1. Dark grey shading indicates the general extent of mangrove vegetation. Stippling indicates the general location of intertidal flats. Dashed lines are sealed roads. 178
12.2 Location of test pits along Transects A, B and C at Eurimbula Site 1, showing topography in the immediate area of the transects. 182
12.3 General view of steep c.2m high erosion bank at the southern end of Eurimbula Site 1 fronting Round Hill Creek. Facing northwest. 182
12.4 Large stone artefact (FS1/2001) manufactured on rhyolitic tuff located mid-way down the erosion bank. Facing west. 182
12.5 Cleaned c.2.5m high section of erosion bank located along the southern third of the site, showing dark band of coffee rock mid-way down the profile. Facing west. 183
12.6 General view of completed excavation, Square E1, showing shell lens mid-way down the western profile. Facing west. 183
12.7 Close-up view of mud ark (A. trapezia) shell lens encountered during excavation, Square E1, XU10. Facing west. 183
12.8 General view of completed excavation at Squares A–D. Note large roots towards the top of the profile. Facing southwest. 183
12.9 Stratigraphic section, Eurimbula Site 1, Squares A–D. 186
12.10 Age-depth relationship of all radiocarbon determinations obtained at Eurimbula Site 1 (n=12). The linear regression shown only includes the six dates obtained on charcoal samples from Transect A, Squares A–D, E1–E2. 187
12.11 Abundance of artefactual stone. 190
12.12 Abundance of fish bone. 190
12.13 Abundance of oyster (S. glomerata). 191
12.14 Abundance of mud ark (A. trapezia). 191
12.15 Abundance of dominant shell taxa. 191
12.16 Abundance of organic material. 192
12.17 Abundance of charcoal. 192
12.18 Abundance of charcoal. 192
13.1 Aerial view of the Tom’s Creek Site Complex area (after BPA Run 10B/57, 30 July 1996). The dashed box encloses the approximate area shown in Fig. 13.2. Based on data provided by the Department of Natural Resources and Mines, Queensland 2006, which gives no warranty in relation to the data (including accuracy, reliability, completeness or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. 203
13.2 Site plan of area of Squares A–S. Contours are in 0.5m intervals. 203
13.3 Schematic diagram of the layout of Squares A–D and E–Q, showing distribution of collected glass artefacts as solid dots (not to scale). 205
13.4 General view of area of glass scatter after removal of leaf litter. Flags indicate the position of glass artefacts. Facing northeast. 206
13.5 Glass artefact (FS188) cached in quinine tree. Facing north. 206
13.6 General view of completed excavation, Squares A–D. Facing northwest. 206
13.7 General view of shell material concentrated on erosion bank of Residual 1. Facing south.
13.8 General view of completed excavation, Squares R–S. Note position of shell material in the upper deposit. Facing north.
13.9 Core taken from below the limits of excavation, Square S. Note distinctive break (at c.75cm below ground surface) between coarse light yellow sands and dark organic muds.
13.10 Stratigraphic section, Tom’s Creek Site Complex, Squares A–D.
13.11 Stratigraphic section, Tom’s Creek Site Complex, Squares R–S.
13.12 Abundance of dominant shell taxa.
13.13 Abundance of dominant shell taxa.
13.14 Abundance of artefactual stone.
13.15 Abundance of artefactual stone.
13.16 Abundance of fish bone.
13.17 Abundance of fish bone.
13.18 Abundance of charcoal.
13.19 Abundance of charcoal.
14.1 Occupation spans of dated sites on the southern Curtis Coast, based on 1σ calibrated age-ranges. Note that a span of 100 years is estimated for the modern dates reported for WCM and EC2.
14.2 Estimated number of dated sites occupied on the southern Curtis Coast in each 500 year period, based on the mid-points of calibrated age-ranges.
14.3 Estimated number of new sites established on the southern Curtis Coast in each 500 year period. Note that the mid-point of the calibrated age-range of the oldest date available for each site is assumed to be the basal age.
14.4 Calibrated radiocarbon ages from the southern Curtis Coast (n=58) arranged in order of increasing age. Error bars show the 1σ calibrated age-range. Note the apparent gap between 1,050–1,250 years ago.
14.5 Number of sites on the southern Curtis Coast with central calibrated radiocarbon dates falling in each 500 year period, measured at 250 year intervals. For comparison, the same data are shown for all of southeast Queensland and the Moreton Bay region.
14.6 Summed probability plot of all calibrated radiocarbon ages (n=56) normalised to a maximum of one. Note that the two modern dates reported for WCM and EC2 are excluded.
14.7 Total weight of shell recovered from all excavated sites per 500 year interval. Note logarithmic scale.
14.8 Shellfish diversity calculated using the Shannon-Weaver Function (H’) per 500 year interval.
14.9 Total weight of fish bone recovered from all excavated sites per 500 year interval.
14.10 Total weight of charcoal recovered from all excavated sites per 500 year interval.
14.11 Total weight of stone artefacts recovered from all excavated sites per 500 year interval.
14.12 Abundance of local (line) versus non-local (black columns) stone artefact raw materials per 500 year interval.
14.13 Estimated site area for excavated sites.
14.14 Shell density as a unit of weight of excavated deposit for excavated sites. Only shell-bearing squares are included in calculations. Note logarithmic scale.
14.15 Shell density as a unit of area of excavated deposit.
14.16 Extrapolated total site shell content based on site area and shell density.
15.1 Southeast and central Queensland showing the location of major archaeological projects.
### List of Tables

1.1 Average number of dates/site for various subsets of the radiocarbon dates available for archaeological sites in Queensland (Ulm and Reid 2000).  
1.2 Creek/estuary characteristics in the study region (Olsen 1980a:17–25).  
1.3 Radiocarbon dates from unexcavated sites in the study region (see Appendix 1 for full radiometric data for each determination). ABM=Agnes Beach Midden; MISS=Middle Island Sandblow Site; RHCM=Round Hill Creek Mound; WCM=Worthington Creek Midden. Dates on shell were calibrated using a ΔR value of +10±7, except Wk-10090 where ΔR= −155±55 (see Chapter 4 for further details).  
2.3 Middle Island Sandblow Site, Squares A–E: summary excavation data and dominant materials.  
3.1 Summary of excavated sites (arranged north to south).  
4.1 Original 1970s series of radiocarbon dates obtained on live-collected marine shell samples from Australian waters presented by Gillespie (1977; Gillespie and Temple 1977). δ¹³C is an assumed value of 0±2 (Gillespie and Polach 1979:410). Historical ages of shell samples were converted to equivalent global marine model ages using data from Stuiver et al. (1998a). ΔR was calculated by deducting the equivalent marine model age of the historical age of the shell sample from the ¹⁴C age of the shell sample (after Stuiver et al. 1986:1020). ΔRσ = √(σhistorical age²+σmarine model age²+σ¹⁴C age²) (Gillespie 1982). The uncertainty in the marine model age includes estimated error in the calibration dataset (derived from Stuiver et al. 1998a). Error-weighted means are calculated using formulae in Ward and Wilson (1978). Samples: Mo=Mactra obesa; Pb=Pinna bicolor; Pm=Pinctada margaritifera; Pl=Proxichione laqueata; Dd=Donax deltoides; Kr=Katelysia rhytaphora.  
4.2 Radiocarbon dates obtained on live-collected marine shell samples of known historical age from the Gulf of Carpentaria (Rhodes et al. 1980). Samples: A=Anadara sp.; Tt=Telescopium telescopium. See caption for Table 4.1 for details of calculations.  
4.3 ΔR values for Abraham Reef and Heron Island coral cores (after Reimer and Reimer 2000). Samples: Porites australiensis. See caption for Table 4.1 for details of calculations.  
4.4 Post-AD 1950 live-collected shell (Gillespie and Polach 1979:Table 5; Rhodes et al. 1980:Table 1). Samples: Mep=Mytilus edulis planulatus; Pe=Pyrazus ebeninus; V=Volachlamys sp.; Ss=Saccostrea succulata.  
4.5 Radiocarbon ages obtained on ‘pre-bomb’ live-collected marine shell samples from central Queensland. Samples: Dd=Donax deltoides; At=Anadara trapezia; Vs=Volachlamys singaporina. See caption for Table 4.1 for details of calculations.  
4.6 Shell/charcoal paired samples from the southern Curtis Coast. ¹⁴C ages obtained on charcoal samples were reduced by 41±14 years to correct for ¹⁴C variation between and northern southern hemispheres (McCormac et al. 2002). An estimate of the atmospheric calibration curve error, derived from an average of estimated error in the 1σ span of the age, was also included. Therefore, atmospheric age σ = √(σ¹⁴C age²+σsouthern hemisphere offset²+average of calibration curve error²) (Gillespie 1982). Note that the incorporation of southern hemisphere offset error in this formula assumes that each atmospheric conventional radiocarbon age derives from an independent secondary reservoir (see Jones and Nicholls 2001 for discussion). The 1σ range of the ¹⁴C value was converted to the equivalent global marine model 1σ range using atmospheric ages interpolated from INTCAL98 to the same calendar year as MARINE98 (Stuiver et al. 1998a). ΔR was
calculated by deducting the mid-point of the equivalent marine model age of the charcoal
determination from the $^{14}$C age of the paired marine shell sample. $\Delta R = \sqrt{\sigma_{\text{marine model age}}^2 + \sigma_{\text{marine shell age}}^2}$ (Gillespie 1982). This method is illustrated for pair NZA-
12117/Wk-8326 in Fig. 4.3.

4.7 Calibrated radiocarbon ages from the Seven Mile Creek Mound, using
various $\Delta R$ values.

5.1 Attributes of articulated $A. trapezia$ specimens recovered from the Seven Mile
Creek Mound in rank order of correlation coefficient. Note that specimens were only
included if there was no damage inhibiting accurate measurement of each attribute on
either valve in a pair.

5.2 Attributes of live-collected $A. trapezia$ specimens in rank order of correlation coefficient.

5.3 Identified $A. trapezia$ conjoin sets, Seven Mile Creek Mound, Square A.

5.4 Additional $A. trapezia$ conjoin sets identified during the blind test, Seven Mile Creek
Mound, Square A.

5.5 Summary of maximum distance separating all conjoined $A. trapezia$ valve-pairs,
Seven Mile Creek Mound, Square A.

6.1 Stratigraphic Unit descriptions, Seven Mile Creek Mound, Squares A–D.

6.2 Radiocarbon dates from the Seven Mile Creek Mound, Square A (see Appendix 1
for full radiometric data for each determination).

6.3 Presence/absence of shellfish identified in the Seven Mile Creek Mound, Square A.

6.4 Metrical data for intact and broken (with umbo) $A. trapezia$ valves from the
Seven Mile Creek Mound, Square A.

6.5 Fish bone abundance, Seven Mile Creek Mound, Square A.

6.6 Fish bone taxonomic representation, Seven Mile Creek Mound, Square A.

6.7 Stone artefacts from the Seven Mile Creek Mound, Square A.

7.1 Stratigraphic Unit descriptions, Mort Creek Site Complex, Squares A–D.

7.2 Radiocarbon dates from the Mort Creek Site Complex (see Appendix 1 for
full radiometric data for each determination).

7.3 Identified $A. trapezia$ conjoin sets, Mort Creek Site Complex, Square C.

7.4 Presence/absence of shellfish identified in the Mort Creek Site Complex, Square C.

7.5 Metrical data for intact and broken (with umbo) $A. trapezia$ valves from the
Mort Creek Site Complex, Square C.

7.6 Fish bone abundance, Mort Creek Site Complex, Square C.

7.7 Fish bone taxonomic representation, Mort Creek Site Complex, Square C.

7.8 Stone artefacts from the Mort Creek Site Complex, Square C.

8.1 Pancake Creek Site Complex, Squares A–H: summary excavation data
and dominant materials.

8.2 Stratigraphic Unit descriptions, Pancake Creek Site Complex, Squares A–B.

8.3 Stratigraphic Unit descriptions, Pancake Creek Site Complex, Squares C–F.

8.4 Stratigraphic Unit descriptions, Pancake Creek Site Complex, Squares G–H.

8.5 Radiocarbon dates from the Pancake Creek Site Complex (see Appendix 1
for full radiometric data for each determination).

8.6 Presence/absence of shellfish identified in the Pancake Creek Site Complex,
Squares A–H.

8.7 Stone artefacts from the Pancake Creek Site Complex, Squares A–H.

9.1 Ironbark Site Complex, Squares E–R: summary excavation data and
dominant materials.

9.2 Stratigraphic Unit descriptions, Ironbark Site Complex, Square E.
9.3 Stratigraphic Unit descriptions, Ironbark Site Complex, Squares L–M.

9.4 Stratigraphic Unit descriptions, Ironbark Site Complex, Square N.

9.5 Stratigraphic Unit descriptions, Ironbark Site Complex, Squares O–P.

9.6 Stratigraphic Unit descriptions, Ironbark Site Complex, Squares Q–R.

9.7 Radiocarbon dates from the Ironbark Site Complex (see Appendix 1 for full radiometric data for each determination). * = assumed value only.

9.8 Presence/absence of shellfish identified in the Ironbark Site Complex, Squares L–R.

9.9 Fish bone abundance, Ironbark Site Complex, Squares N, O and P.

9.10 Stone artefacts from the Ironbark Site Complex, Squares E, L–R.

10.1 Eurimbula Creek 1, Squares A–D: summary excavation data and dominant materials.

10.2 Stratigraphic Unit descriptions, Eurimbula Creek 1, Squares A–D.

10.3 Radiocarbon dates from Eurimbula Creek 1 (see Appendix 1 for full radiometric data).

10.4 Presence/absence of shellfish identified in Eurimbula Creek 1, Squares A–D.

10.5 Fish bone abundance, Eurimbula Creek 1, Squares A–D.

10.6 Presence/absence of shellfish identified in Eurimbula Creek 1, Squares A–D.

10.7 Metrical data for intact and broken (with umbo) *A. trapezia* valves from Eurimbula Site 1, Squares A–D. Note that excavation units for each square have been collapsed for purposes of analysis. Excavation unit depth and size is approximately equivalent across squares for broad comparison.

12.1 Fish bone abundance, Eurimbula Site 1, Squares E1–E2.

12.2 Eurimbula Site 1, Squares A–D: summary excavation data and dominant materials. Data from Squares E1–E9 are included for comparison (after Ulm et al. 1999a:Appendix A–I).

12.3 Stratigraphic Unit descriptions, Eurimbula Site 1, Squares A–D.

12.4 Radiocarbon dates from Eurimbula Site 1 (see Appendix 1 for full radiometric data for each determination). E* This date was undertaken on a sample of shell from a dense surface scatter adjacent to Square E7.

12.5 Identified *A. trapezia* conjoin sets, Eurimbula Site 1, Squares A–D.

12.6 Presence/absence of shellfish identified in Eurimbula Site 1, Squares A–D.

12.7 Metrical data for intact and broken (with umbo) *A. trapezia* valves from Eurimbula Site 1, Squares A–D. Note that excavation units for each square have been collapsed for purposes of analysis. Excavation unit depth and size is approximately equivalent across squares for broad comparison.

12.8 Fish bone abundance, Eurimbula Site 1, Squares A–D.

12.9 Stone artefacts from Eurimbula Site 1, Squares A–D.

13.1 Tom’s Creek Site Complex, Squares A–D, R–S: summary excavation data and dominant materials.

13.2 Stratigraphic Unit descriptions, Tom’s Creek Site Complex, Squares A–D.

13.3 Stratigraphic Unit descriptions, Tom’s Creek Site Complex, Squares R–S.

13.4 Radiocarbon dates from the Tom’s Creek Site Complex (see Appendix 1 for full radiometric data for each determination).

13.5 Identified *A. trapezia* conjoin sets, Tom’s Creek Site Complex, Squares A–D.

13.6 Identified *A. trapezia* conjoin sets, Tom’s Creek Site Complex, Squares R–S.

13.7 Presence/absence of shellfish identified in the Tom’s Creek Site Complex, Squares A–S.

13.8 Metrical data for intact and broken (with umbo) *A. trapezia* valves from the Tom’s Creek Site Complex, Squares A–D. Note that excavation units for each square have been collapsed for purposes of analysis. Excavation unit depth and size is approximately equivalent across squares for broad comparison.
13.9 Metrical data for intact and broken (with umbo) *A. trapezia* valves from the Tom’s Creek Site Complex, Squares R–S. Note that excavation units for each square have been collapsed for purposes of analysis. Excavation unit depth and size is approximately equivalent across squares for broad comparison.

13.10 Fish bone abundance, Tom’s Creek Site Complex, Squares A–D.

13.11 Fish bone abundance, Tom’s Creek Site Complex, Squares R–S.

13.12 Stone artefacts from the Tom’s Creek Site Complex, Squares A–D, R–S.

13.13 Glass artefacts from the Tom’s Creek Site Complex. * indicates glass artefacts recovered beyond the mapping grid (see Fig. 13.3).

14.1 Radiocarbon dates from the southern Curtis Coast excluded from chronological analyses.

14.2 Summed probability distribution of all calibrated radiocarbon dates available from cultural contexts on the southern Curtis Coast (n=56). Excludes the two modern determinations (Wk-7681; Wk-7689). 0* indicates a modern age.

14.3 Radiocarbon ages from the southern Curtis Coast dating to the 1,500–2,000 cal BP interval, calibrated using various ∆R values.

14.4 Top 10 shellfish taxa from all excavated deposits ranked by weight and minimum number of individuals. Note that the four taxa of terrestrial gastropod have been excluded.

14.5 Shell density characteristics of excavated sites arranged in descending order of total estimated shell content.